

A Generalization on the Rules Governing the Flow of  
Fluids Through Granular Layers

SOV/156-59-1-54, 54

ASSOCIATION: Kafedra gidravliki Kazanskogo khimiko-tekhnologicheskogo  
instituta im. S. M. Kirova (Chair of Hydraulics of the Kazan'  
Institute of Chemical Technology imeni S. M. Kirov)

SUBMITTED: October 10, 1958

Card 3/3

USCCMM-DC-60,911

Some Generalizations in the Hydraulics of a Grain Layer

SOV/153-2-3-28/29

n is characteristic of the different conditions. It may be seen from the diagram that three different conditions occur: laminar, transition, and turbulence. This method of representation makes it possible to find the equations for each granular material by 2-3 experiments. It could be shown that filtration and passing thru of a liquid in a floating layer are subject to the same rules. There are 1 figure and 21 references, 13 of which are Soviet.

ASSOCIATION:

Kazanskiy khimiko-tekhnologicheskii institut imeni S. M. Kirova,  
Kafedra gidravliki (Kazan' Institute of Chemical Technology  
imeni S. M. Kirov, Chair of Hydraulics)

SUBMITTED:

June 16, 1958

Card 2/2

STEPOCHKIN, B. F. (Kazan')

"Extention of the Laws of Hydrodynamics to Granular Porous to Granular Porous Media."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb 1960.

STEPOCHKIN, B.F.

Free sedimentation of particles of irregular shapes. Izv.vys.ucheb.  
zav.; khim.i tekhn. 3 no.1:204-207 '60. (MIRA 13:6)

1. Kafedra gidravliki Kazanskogo khimiko-tehnologicheskogo  
instituta imeni S.M. Kirova.  
(Precipitation (Chemistry))

STEPOCHKIN, B.F., inzh.

Determining the velocity of flying particles of arbitrary form.  
Teploenergetika 7 no.5:53-55 My '60. (MIRA 13:8)

1. Kazanskiy khimiko-tekhnologicheskii institut.  
(Particles) (Aerodynamics)

ZAYNULLIN, Z.F.; STEPOCHKIN, B.F., otv. red.

[Compressing machinery (summaries of lectures); manual for correspondence students specializing in mechanical engineering] Kompessornye mashiny (konspekt lektsii); uchebnoe posobie dlia studentov mekhanicheskikh spetsial'nostei zaochnogo fakul'teta. Kazan', Kazanskii khimiko-tekhnologicheskii in-t im. S.M.Kirova, 1964. 155 p. (MIRA 18:3)

LEPICHEN, K.A., polkovnik, voyenny letatnyy person klassa

The personal exemplariness of commanders is a guarantee of  
successful flight work. Mor. sbor. 48 no.7:45-47 JI '65.  
(MIRA 18:8)

STEPOCHKIN, M., starshina sverkhstrochnoy sluzhby, master bozhdeniya  
tanka

In the slushy season. Starsh.-serzh. no.4(7):29 Ap '61.  
(MIRA 14:7)  
(Tanks (Military science)—Gold weather operation)



STEPOCHKINA, M.D., meditsinskaya sestra (Moskva)

How to make a blood transfusion. Med. sestra no.1:19-21

Ja '56  
(MLRA 9:3)

(BLOOD--TRANSFUSION)

BEKAURI, N.V.; KOROLEV, V.I.; STEPOCHKINA, N.A.; ROSAKOVA, K.G.

Effect of pilocarpine and atropin on the size of the pupil and intraocular pressure in rabbits in normal conditions and in disorders of the innervation of the eye. Fiziol. zhur. 47 no.7:821-825 J1 '61.

(MIR 15:1)

1. From the Laboratory of Trophic Innervation, I.P.Pavlov Institute of Physiology, Leningrad.

(ALKALOIDS--PHYSIOLOGICAL EFFECT)

(PUPIL (EYE)) (INTRAOCULAR PRESSURE) (EYE--INNERVATION)

VASIL'YEVA, V.V.; STEPICHKINA, N.S.

1. Hemodynamic indices in the period of restoration following muscular activity. Fiziol. zhur. 51 no.11:1308-1314 N '65.  
(MIRA 18:11)

2. Kafedra fiziologii Instituta fizicheskoy kul'tury imeni P.F. Lesgafta, Leningrad.

STEPONAITIENE, Liudmila, kand. med. nauk; PAPECKIENE, S., red.;

PAKERYTE, O., tekhn.red.

[Let us eliminate diphtheria] Likviduokime difterija. Vilnius,  
Valstybine politines ir mokslines literaturos leidykla, 1961.

15 p.

(MIRA 15:3)

(DIPHTHERIA)

STEFONAITIENE, Liudmila; MAUBLYS, Petras; FABKEZIENE, A., red.

[The child grows] Vaikas auga. Vilnius, Leidykla  
"Mintis." 1965. 253 p. [In Lithuanian] (MIRA 18:6)

CIBIRAS, P., kand. med. nauk; DAKTA-AVICIENE, E., kand. med. nauk;  
JARZEMSKAS, J., kand. med. nauk [deceased]; JOCEVICIENE, A.,  
kand. med.nauk; KRIKSTOFAITIS, M., kand. med. nauk; NENISKIS, J.,  
kand. med. nauk; STEPONAITIENE, L., kand. med. nauk; SURKUS, J.,  
kand. med. nauk; SIIMANAS, S., kand. biolog. nauk; CEPULIS, St.,  
prof.; KUPCINSKAS, J., prof.; LASAS, Vl., prof.; SIDERAVICIUS, Br.,  
prof.; KANOPKA, E., dots.; KVINKYS, V., dots.; LABANAUSKAS, K.,  
dots.; POLUKOCHAS, H., dots.; BABUBLYS, P., doktor; CAPKEVICIUS, V.,  
doktor; MAKARIUNAS, P., doktor; PAKONAITIS, P., doktor; STUCKA, R.,  
doktor; SURGAILIS, H., doktor; PAULIUKONIECE, J., red.; ANAITIS, J.,  
tekh. red.

[Health and diseases] Antrasis pataisytas leidimas. Vilnius,  
Valstybine politines ir mokslines literaturos leidykla, 1961. 356 p.  
(MIRA 15:3)

(HYGIENE) (PATHOLOGY)

STEPOTAITIENE, L., med.m.kand.; RYBALKO, V.

Staphylococcal pneumonias in children. Sveik. apsaug. 8 no.8:  
30-33 Ag'63.

1. Vilniaus Valst. V.Kapsuko v. universiteto Medicinos fu-  
kultetas.

\*

STEPONAVICHYTE, A. V. [Steponaviciute, A.]; VIZBARAYTE, Ya. I. [Vizbaraitė, J.];  
YUTSIS, A. P. [Jucys, A.], akademik

Transformation matrix of a three-electron wave function between LS  
and J1 couplings. Liet ak darbai no.3:41-52 '61.

1. Institut fiziki i matematiki Akademii nauk Litovskoy SSR i Vil'-  
nyusskiy gosudarstvennyy universitet im. V. Kapsukasa.



STFPONAVICIENE, V.

Vitamin C content in food of some restaurants in Kaunas.  
Sveik. apsaug. 6:31-34 S '64.

1. Kauno Valst. medicinos instituto higienos katedra. (Katedros  
vedejas - prof. J. Sopauskas).

SPR. MAYEVSK, L.P., Cand Med Sci -- (diss) "peculiarities  
of <sup>the</sup> diagnosis, clinic, and treatment of tubercular meningitis  
in early age (up to three years)." Vil'nyis, 1948,  
17 in (Min of Higher Education USSR. Vil'nyis  
State Univ in V. Karsukas) 10. no. 10 (2L, 2-5, 137)

- 129 -

TILIS, A. Yu.; VENGERSKAYA, Kh. Ya.; STEPOVAYA, N. Ye. (Tashkent)

Diagnostic significance of the value of the coefficient of insufficient oxidation during the action of heavy metals. Gig. truda i prof. zab. no.3:30-34 '62. (MIRA 15:4)

1. Uzbekskiy nauchno-issledovatel'skiy institut sanitarii, gigiyeny i profzabolevaniy.

(METALS—TOXICOLOGY)  
(OXIDATION, PHYSIOLOGICAL)

STEPONAVICIENE, V.

Vitamin C content in preserved vegetables. Sunk. Apsaug.  
no.4:33-36 '64.

1. Kauno Valst. medicinos instituto higienos katedra (Katedros  
vedejas - prof. J. Sopauskas).

Electronic circuit relay in electron tube equipment. Avt.  
var. 12 nov. 77 by 161. (R. 12. 12)

S/020/63/148/001/026/032  
B101/B186

AUTHORS: Stepovik, L. P., Shilova, A. K., Shilov, A. Ye.  
TITLE: Kinetics and mechanism of the initiation of ethylene polymerization on a soluble Ziegler-type complex catalyst  
PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 1, 1963, 122-125

TEXT: In a previous paper (Vysokomolek. soyed., 4, no. 11 (1962)) the following reaction pattern was found for the polymerization of olefins on a  $(\pi-C_5H_5)_2TiCl_2 + Al(CH_3)_2Cl$  catalyst:

$$(C_5H_5)_2TiCl_2 + Al(CH_3)_2Cl \rightarrow (C_5H_5)_2Ti(CH_3)Cl \cdot AlCH_3Cl_2 \text{ (complex A)};$$

$$A \rightleftharpoons (C_5H_5)_2TiCH_3^+ + Al(CH_3)Cl_2^-;$$

$$\rightarrow (C_5H_5)_2TiCH_2CH(R)CH_3^+ + AlCH_3Cl_2^- \rightarrow$$

$$\rightarrow (C_5H_5)_2TiCH_2CH(R)CH_3Cl \cdot Al(CH_3)Cl_2 \text{ (complex B)};$$

$$(C_5H_5)_2TiCH_2CH(R)CH_3Cl \cdot Al(CH_3)Cl_2 \rightarrow (C_5H_5)_2TiCl \cdot AlCH_3Cl_2 \text{ (complex C)}.$$

Card 1/3

$\epsilon = 4, 1.7 \pm 0.1$   
the specific effect

the ethylene polymerization is  
the linear  $C_3H_7$  radical is formed  
a group  $-CH_2-CH(CH_3)R$  is formed from the

Kinetics and mechanism of the ...

S/020/63/148/001/026/032  
B101/B186

$\alpha$ -olefins of the formula  $RCH=CH_2$ ; this group is easily converted to the isoolefin  $CH_2=c(CH_3)R$ , with the titanium being reduced and termination occurring. This generally holds for Ziegler catalysts by which ethylene, but no other  $\alpha$ -olefins, can be polymerized. An active B complex is formed only with  $C_2H_4$ . The ratio  $k_2/k_1$  between the constant  $k_2$  for chain propagation and  $k_1$  for initiation was found to be 18.9, in good agreement with the value, 19, found from the ratio between maximum rate of polymerization at constant  $p_{C_2H_4}$  and the initial rate of complex formation. These results do not confirm the assumptions made by J.S.W. Chien (J. Am. Chem. Soc., 81, 86 (1959)) and G.L. Karapinka, W.L. Carrick (J. Polym. Sci., 55, 145 (1961)). There are 3 figures and 1 table.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

PRESENTED: July 23, 1962, by N.N. Semenov, Academician

SUBMITTED: July 23, 1962

Card 3/3

RAZUVAYEV, G.A.; STEPPOVIK, L.P.; MITROFANOVA, Ye.V.

Reactions of aluminum triisopropylate with acyl peroxides. Izv.AN  
SSSR. Ser.khim. no.1:162-164 Ja '64. (MIRA 17:4)

1. Nauchno-issledovatel'skiy institut pri Gor'kovskom gosudarstvennom  
universitete im. N.I.Lobachevskogo.



RAZUVAYEV, G.G.; STEPNIK, I.P.; MITROFANOVA, Ye.V.

Reactions of aluminum triisopropylate with peroxides and  
anhydrides. Zhur. ob. khim. 35 no.6:1095-1098 Je '65.  
(MIRA 18:6)

1. Nauchno-issledovatel'skiy institut khimii pri Gor'kovskom  
gosudarstvennom universitete imeni Lobachevskogo.

BA 10741, 10742; 110716, 110717.

reactions of organoaluminum compounds with acyl peroxides and anhydrides. Zhur. ob. khim. 35 no.9:1672-1676 5 '66.

(NY 100)

1. Nauchno-Issledovatel'skiy Institut Khimii pri Gorkovskom gosudarstvennom universitete imeni N.I. Izhmerkova.

RAZUVAYEV, G.A.; STEPOVIK, L.P.; PERVEYEV, F. Ya.; DEMIDOVA, V.M.;  
ALANIYA, V.P.; SOKOLOV, N.A.; KHARCHENKO, V.G.; KRUPINA, T.I.;  
KLIMENKO, S.K.; RASSUDOVA, A.A.; GORELIK, M.V.

Letters to the editors. Zhur. org. khim. 1 no. 12:2244-2246  
D '65 (MIRA 19:1)

1. Nauchno-issledovatel'skiy institut khimii pri Gor'kovskom  
gosudarstvennom universitete (for Razuvayev, Stepovik). 2. Le-  
ningradskiy gosudarstvennyy universitet (for Perveyev, Demidova).  
3. Moskovskiy institut neftekhimicheskoy i gazovoy promysh-  
lennosti imeni Gubkina (for Alaniya, Sokolov). 4. Saratovskiy  
politekhnicheskiy institut (for Kharchenko, Krupina, Klimenko,  
Rassudova).

PEYVE, Ya.V. [Peive, J.]; ANSPOK, P.I. [Anspoks, P.]; PAKALN, G.Zh.  
[Pakalns, G.]; KONONENKO-Stepovaya, T.A.; STEPVOY, A.I.

Mapping trace element contents of soils on a collective farm and  
estimating the effectiveness of the use of fertilizers. Pochvo-  
vedenie no.7:1-9 J1 '64. (MIRA 17:8)

1. Institut biologii AN Latvyskoy SSR..

M-2

USSR/Cultivated Plants - Grains.

Abs Jour : Ref Zhur - Biol., No 7, 1958, 29756

Author : Koz'mina, Ye.P., Stepovskaya, G.N.

Inst : -

Title : The Shatilovskaya 4, a New Buckwheat Variety.

Orig Pub : Inform. byul. Gos. komis. po sortoispyt. s. -kh. kul-tur  
pri m-ve s. kh. SSSR, 1957, No 2, 26-29

Abstract : Shatilovskaya 4 variety buckwheat, cultivated by the  
orlovskaya Oblast' Experimental Agricultural Station  
(formerly the Shatilovskaya) from the Bogatyr' variety  
by means of seed selection, has been districted for  
rayons of the chernozem soil zone in 1956. It is close  
to the Bogatyr' variety in biological and morphological  
characteristics, although it surpasses the latter and a  
number of other selected varieties in its grain yield and  
quality in a number of rayons. The indices for the mean  
harvests and groat yield for 1 hectare of shatilovskaya 4

Card 1/2

KOZ'MINA, Ye.P., doktor tekhn.nauk; STEPPOVSKAYA, G.N., agronom

Pay more attention to the cultivation of buckwheat. Zemledelie 7  
no.3:63-67 Mr '59. (MIRA 12:4)

(Buckwheat)

STEPOVYY, V. [Stepovyi, V.]

Journey across our homeland ("Touring the reserves of the  
Ukraine." Reviewed by V. Stepovyi). Znan. ta pratsia no.7:  
22 J1 '61. (MIRA 14:8)  
(Ukraine--National parks and reserves)

STEPCHIC, B

"Advanced agricultural technique is required in the cultivation of buckwheat." (p.105)  
NOWE ROZNICTWO (Panstwowe Wydawnictwo Rolnicze in Lesne) Warszawa, Vol. 3, no. 4,  
Apr. 1954

SO: EAST European Accessions List, Vol 3, no. 8, August 1954



STEPOWSKI, Bronislaw

The pituitary gland and pregnancy. Ginek. pol. 34 no.1:14-26  
'63.

1. Z II Kliniki Poloznictwa i Chorob Kobietych Sl. A.M. w  
Bytomiu.

(PITUITARY GLAND)

STEPOWSKI, Bronislaw (Krakow)

Occupational activities during menstruation. Przegl. lek.,  
Krakow 10 no.6:186 -188 1954.

(MENSTRUATION,

work in)

(WORK,

in menstruation)

STEPOWSKI, Bronislaw (Krakow, Batorego 7)

Latent syphilis in pregnancy. Gln. polska 25 no.1:75-78 Ja-Mr '54.  
(PREGNANCY, in various diseases,  
\*syphilis, latent)  
(SYPHILIS, in pregnancy,  
\*latent)

STEPOWSKI, Bronislaw (Krakow, Batorego 7)

Gestational polyneuritis. Gin. polska 26 no.1:73-79 Jan-Mar 55.

(PREGNANCY, complications,  
polyneuritis)

(POLYNEURITIS, in pregnancy.)

STEPOWSKI, Bronislaw

The theory of Alexander Rosner concerning the constitution of female sex organs in the light of recent concepts. Gln. polska 29 no.5: 589-594 Sept-Oct 58.

1. Z II Kliniki Poloznictwa i Chorob Kobietych Slaskiej A. M. w Bytomiu Kierownik Kliniki: prof. dr med. B. Stepowski. II Klinika Poloznictwa i Chorob Kobietych A. M. Bytom, ul. Batorego 15.

(GENITALIA, FEMALE, anat. & histol.  
constitution characteristics, comparison of Rosner's  
theory with current theories (Pol))

SHMAKIN, B.M.; STEPPAN, M.O.

Two sphenes from Archean pegmatites in the Aldan Shield.  
Izv.vys.ucheb.zav.;geol.i razv. 4 no.10:59-65 C 1961. (MIRA 14:12)

1. Moskovskiy geologorazvedochnyy institut imeni S.Ordzhonikidze.  
(Aldan Plateau--Titanite)

SYNOPSIS : POLYMER  
 ORIGIN : Chemical Technology, Plastic Products and  
 Their Applications, Synthetic Polymers.  
 REF. 100% : Adh. 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.  
 TITLE : Special 1.  
 TYPE : Automobile parts made of plastics  
 REF. 100% : Techn. Polym., 1952, 2, No 12-11, Biol.  
 Ref. 100% : Techn. Polym., 1952, 2, No 5, 1.  
 SUMMARY : Described is the application of plastics in  
 place of metal and other materials in the  
 construction of automobile parts: bearings,  
 levers, handles, coverings, parts of brake  
 cylinder and steering shaft, seats, etc. It  
 has been established, for instance, that spring  
 stoppers made of glass-lexolite stand well  
 after 15-20 thousand kilometers while bronze  
 stoppers could not last more than 10 thousand  
 kilometers. -- S. S. Sidorov  
 \*Plastics.  
 1/1

STEPANE, I.

Economic situation of Vidzeme peasant-farmers in the 30's and 40's  
of the 19th century. Vestis Latv ak no.6:29-36 '60.  
(EEAI 10:9)

(Latvia--Peasantry



STEPUK, Ya.V.

6(4)

PHASE I BOOK EXPLOITATION

SOV/2882

Kalashnikov, Anatoliy Mikhaylovich, and Yakov Vasil'yevich Stepuk

Osnovy radiotekhniki i radiolokatsii, Kniga 1: Kolebatel'nyye sistemy  
(Principles of Radio Engineering and Radar, Book 1: Oscillation  
Systems) Moscow, Voenizdat, 1959. 354 p. No. of copies printed  
not given.

Ed.: S. N. Tikhonov, Engineer, Colonel; Tech. Ed.: G. F. Sokolova.

PURPOSE: This book is intended for students of military radio  
schools. It may be of interest to military officers engaged in  
the operation of radio equipment and also students of civilian  
schools studying radio and radar.

COVERAGE: The authors discuss resonant circuits transmission lines,  
waveguides, cavity resonators and antennas. Attention is given  
to physical aspects of processes taking place in these devices.  
Formulas and expressions in the book involve techniques of  
secondary-school mathematics. Introduction was written by  
Major V. G. Levichev; Chapter 1 by Major A. M. Kalashnikov;

Card 1/12

SLUTSKIY, Veniamin Zakharovich; FOGEL'SON, Boris Il'ich; LEVICHEV, Vladimir Grigor'yevich; YAGODIN, Oleg Gavrilovich; Prinimali uchastiye MUNVEZ-FRENKEL, I.Z.; STEPUK, Ya.V.; MATLIN, I.I., red.; SOLOMONIK, R.L., tekhn. red.

[Fundamentals of radar and radio engineering; display units, rectifiers, and transistor devices] Osnovy radiotekhniki i radio-lokatsii; indikatory, vypriamiteli i poluprovodnikovye pribory. By V.Z.Slutskiy i dr. Moskva, Voen.izd-vo M-va oborony SSSR, 1961. 355 p. (MIRA 14:12)

(Radar) (Radio--Equipment and supplies)

KALASHNIKOV, Anatoliy Mikhaylovich; STEPUK, Yekov Vasil'yevich;  
GAYEVICH, V.N., red.; TIKHONOV, S.N., inzh.-polkovnik,  
red.; KOKINA, N.N., tekhn. red.

[Fundamentals of radio engineering and radar; oscillatory  
systems] Osnovy radiotekhniki i radiolokatski; kolebatel'-  
nye sistemy. Izd.2., perer. Moskva, Voenizdat, 1962.  
365 p. (MIRA 15:11)

(Radio) (Radar)

STEPUK, Y.V.

PHASE I BOOK EXPLOITATION

SOV/6294

Levichev, Vladimir Grigor'yevich, Yakov Vasil'yevich Stepuk and Boris Il'ich Fogel'son.

Osnovy radiotekhniki i radiolokatsii; radioperedayushchiye i radio-priyemnyye ustroystva (Fundamentals of Radio Engineering and Radar; Radio Transmitting and Receiving Devices). Moscow, Voenizdat M-va obor. SSSR, 1962. 494 p. 60,000 copies printed.

Ed.: I. I. Matlin; Tech. Ed.: R. L. Solomonik.

**PURPOSE:** This book is intended for students in schools of Radio Engineering who are taking courses in Radio Engineering and Radar. It should also be useful to military personnel concerned with the operation of radio engineering equipment, as well as to those students in civil schools studying these subjects.

**COVERAGE:** The book describes radio transmitting and radio receiving systems with emphasis on the physical aspect of the phenomena

Card 1/152

L 26409-66 EWT(1)/FSS-2 WR

ACC NR: AM5020527

Monograph

UR/

45

B+1

Kalashnikov, Anatoliy Mikhaylovich; Stepuk, Yakov Vasil'yevich

Principles of radio engineering and radar<sup>14</sup> oscillating systems (Osnovy radiotekhniki i radiolokatsii; kolebatel'nyye sistemy) 3rd ed, rev. Moscow, Voenizdat M-va obor. SSSR, 1965. 382 p. illus. 47000 copies printed.

TOPIC TAGS: oscillator theory, radio engineering, radar engineering, electromagnetic wave

PURPOSE AND COVERAGE: This textbook is intended for students in radio engineering schools specializing in radio and radar. It may also be of interest to military officers engaged in the operation and maintenance of radio and electronic equipment, as well as to students in civilian radio and radar schools. This textbook is one of four volumes on the subject "Principles of Radio Engineering and Radar." Oscillatory systems, electromagnetic power transmission lines, waveguides, cavity resonators, and antennas are covered in this volume. Considerable attention is paid to the physical side of the occurring phenomena. High school-level mathematics is used in this text.

TABLE OF CONTENTS [abridged]

Introduction — 3

Ch. I. Oscillatory circuits — 14

Card 1/2

L 26409-66

ACC NR: AM5020527

Ch. II. Electromagnetic power transmission lines — 124

Ch. III. Waveguides and cavity resonators — 208

Ch. IV. Antennas — 259

SUB CODE: 09, 17/ SUBM DATE: 26Feb65/ OFC

Card 2/2 CC

L 26375-64 EWT(d)/FSS-2  
ACC NR: AM5020529

Monograph

UR/

Levichev, V. G.; Stepuk, Ya. V.; Fogel'son, B. I.

Fundamentals of radio engineering and radar; radio transmitters and receivers (Osnovy radiotekhniki i radiolokatsii; radiopere dayushchiye i radiopriyemnyye ustroystva) 2d ed., rev. Moscow, Voenizdat M-va obor. SSSR, 1965. 583 p. illus. 47,000 copies printed.

TOPIC TAGS: radio transmitter, radio receiver, radio transmitter theory, radio receiver theory

PURPOSE AND COVERAGE: This textbook is intended for students in radio engineering schools specializing in radio communications and radar. It may also be of interest to military officers engaged in the operation and maintenance of radio-communication, radar, and electronic equipment as well as to students in civilian radar and radio schools. This textbook is one of four volumes on the subject "Principles of radio engineering and radar". Radio transmitting and receiving equipment are covered in this volume. Considerable attention is paid to the physical side of phenomena occurring in the processes of transmission and reception. Ch. I., section 1, 2, 3, and 12 and Ch. II were written by V. G. Levichev; Ch. I sections 6, 7, and 8, by Ya. V. Stepuk; sections 4, 9, 10 and 11 by B. J. Fogel'son; and Ch. I section 5 by A. M. Kalashnikov. There are no references.

Card 1/3

L 26375-66

ACC NR: AM5020529

TABLE OF CONTENTS [abridged]:

- Ch. I. Radio-transmitting equipment -- 3
1. General information on radio-transmitting equipment -- 3
  2. Externally-excited tube oscillators -- 6
  3. Long-, medium-, and short-wave self-excited tube oscillators -- 29
  4. Frequency stabilization of self-excited tube oscillators -- 45
  5. Ultrashort-wave self-excited tube oscillators -- 60
  6. Klystron oscillators -- 88
  7. Magnetron oscillators -- 105
  8. Electronic oscillators and traveling wave amplifiers -- 131
  9. Amplitude modulation -- 154
  10. Frequency modulation -- 180
  11. Pulse modulation -- 191
  12. Radio-transmitter circuits -- 222
- Ch. II. Radio-receiving equipment -- 233
1. General information on radio-receiving equipment -- 233
  2. Set noise and sensitivity of a radar receiver -- 245
  3. Input impedance of an amplifier with a grounded cathode -- 258
  4. Input circuits of radio receivers -- 267
  5. High-frequency amplifiers -- 281
  6. Detection of amplitude modulated oscillations -- 321

Card 2/3



1 26375-66

ACC NR: A15020529

7. Frequency conversion -- 347
8. Intermediate-frequency amplifiers -- 385
9. Low-frequency amplifiers -- 401
10. Lf power amplifiers -- 417
11. Negative feedback in amplifiers -- 432
12. Video amplifiers -- 455
13. Terminal stage of a video amplifier -- 471
14. Reception of frequency-modulated oscillations -- 483
15. Automatic gain control -- 499
16. Automatic frequency control -- 516
17. Radio-receiver circuits -- 546

SUB CODE: 09, 17/ SUBM DATE: 25Mar65/

Card

3/3

cc

STE UREIN, A. V.

Geography Study and Teaching

Speech by the old teacher of geography. Vop. geog. 27, 1951

9. Monthly List of Russian Accessions, Library of Congress, April 1953/2 Uncl.

STEROUKHOVICH, A. D.

"Cinétique et mécanisme de la destruction des hydrocarbures. VI. Cinétique de la destruction de l'éthane sous pression réduite." A. N. Dintzes, D. A. Kwjatkowski, A. D. Steroukhovitch, A. W. Frost. (p. 1754)

SO: Journal of General Chemistry (Zhurnal Obshchei Khimii). 1937, Volume 7, No. 12.

CA

2

**Kinetics and mechanism of thermal decomposition of isobutane at low pressures.** A. D. Stupkovich (Rostov State Univ.), *J. Gen. Chem.* 1945, 15, 311-32 (1945)(English summary). The rate of decompn. of isobutane depends on initial concn. and increases with its pressure increase from 1 mm. to 7 mm. The rate decreases with increased extent of decompn. at 580° between 3 and 120 mm.; the reaction curve is of the self-hindering unimol. type. Thus the addn. of propylene hinders the reaction up to 10%, after which the effect becomes smaller and the general equation expressing the effects of a hindering agent is  $W = a/b + KC$ , where  $a$ ,  $b$ , and  $K$  are const.,  $W$  is decompn. rate and  $C$  is propylene concn. The results indicate that propylene hinders the reaction, through the chain breaking by formation of inactive radicals, so that the chain length reaches only 50 units. G. M. Kosolapoff

Lab Phys Chem Rostov State Univ.

ASH-SLE METALLURGICAL LITERATURE CLASSIFICATION

34

30

Rapid method for vulcanizing rubber to ebonite. I  
A. D. Stepanovich. *J. Applied Chem.* (U.S.S.R.) 20, 110-14 (1947) (in Russian).—Work was carried out to develop a rapid method for manufg. completely vulcanized ebonite from raw rubber without reducing the productivity of existing equipment. Factors to be considered are the use of accelerators, especially in combination with other chemicals or combinations of more than 1 accelerator; the use of the heat of vulcanization from the 1st stage of the reaction to promote vulcanization in the middle and later stages; the dimensions and shape of the mold, and, less important, the S concn., press temp., and rubber plasticity. The actual application of these factors to the development of a method of rapid vulcanization and the exptl. results obtained will be described in the next paper of this series. H. K. Livingston

ASB 51.4 METALLURGICAL LITERATURE CLASSIFICATION



CA

30

Inhibition of the vulcanization of rubber. II. A. D. Stepanukhovich (Saratov Phys. Research Inst.). *Zhar. Priklad. Khim.* (J. Applied Chem.) 22, 605-10(1949); cf. C.A. 42, 404f. Analysis of the data of van Rossem shows a 1st-order rate law for combination of S, with  $k \sim 4 \times 10^{-4} \text{ min.}^{-1}$ , to hold up to about 8% of the combined S ( $\sim 20 \text{ hrs.}$ ). A similar evaluation of the data of Weber (*Kolloid. Z.* 1, 31, 65(1906)) on the rate of combination of S in a natural rubber-S mixt. (100:10) at  $120^\circ$  shows a sharp fall in the 1st-order  $k$  from  $2.45 \times 10^{-4} \text{ (min.}^{-1}\text{)}$  at  $7.1\%$  S bound to  $0.85 \times 10^{-4}$  at  $22.5\%$  S (300 min.); at  $135^\circ$   $k$  reaches a min.,  $\sim 2.9 \times 10^{-4} \text{ min.}^{-1}$ , at about  $30\%$  S bound ( $\sim 150 \text{ min.}$ ), then rises slowly because of an exothermal process. Normally, the 1st-order rate const. for the vulcanization of rubber decreases with the progress of the reaction, i.e., the reaction is self-inhibited. Accordingly, its rate is in good agreement with the equation of Dintzes and Frost (C.A. 28, 2508f)  $dx/dt = k(1-x)[1 + \beta(1-x)]$ ; the data of Weber at  $120^\circ$  give, with  $\beta = 1$ ,  $10^4 = 1.0$ ,

satisfactorily const. up to the combination of  $22.5\%$  S (300 min.) (evaluated from the integrated equation  $(1-t)\ln[1/(1-x)] = k - \beta(x/t)$ , by plotting  $(1-t)\ln[1/(1-x)]$  against  $x/t$ ). This cannot be explained by the proximity to equil., which lies far off. It is a case of rupture of chains by certain products. While the nature of the inhibiting products is unknown, the fact that vulcanization is initiated by oxidants suggests that easily oxidizable substances ought to be inhibitors. This is confirmed by observations of the inhibiting effects of aldehydes. At  $150^\circ$ , with the initial mixt. (neutral rubber: S = 100:10) the 1st-order  $k$  after 20, 30, 40 min. (32.36, 42.98, 51.61% of the initial S combined) is, resp.,  $10^4 = 1.95, 1.87, 1.81 \text{ min.}^{-1}$ ; with  $1.7\%$  BzH added, 1.64, 1.54, 1.51 (28.03, 37.73, 45.74% S); with  $1.7\%$  furfural, 1.71, 1.57, 1.50 (28.06, 37.63, 45.16%); with  $1.7\%$  paraldehyde, 1.80, 1.76, 1.69 (31.51, 41.06, 49.13%), the inhibitory power of the aldehydes follows approx. the order of their oxidizability. The known inhibiting action of sugars parallels that of the aldehydes. Possibly, the inhibition involves combination of  $\text{H}_2\text{S}$  or of active S atoms. N. Thon

CA

2

Kinetics and mechanism of the retardation of thermal decomposition of paraffin hydrocarbons by additions. A. D. Stepanovich (Univ., Saratov). *Zhur. Fiz. Khim.* 24, 513-18 (1980); cf. *C.A.* 60, 3252<sup>o</sup>.—The rate  $W$  of decompn. is reduced by  $C\%$  of addn. according to equation  $W = W_0 + a/(1 + bC)$ ;  $W_0$ ,  $a$ , and  $b$  are const. This equation results if the inhibition is due to deactivation of active radicals by the moln. added and the rate of deactivation is proportional to the product of concn. of active radicals and probability of their collision with the moln. added. It agrees with the expts. on cracking  $C_{10}H_{22}$  in the presence of propene, cf. *C.A.* 31, 8277<sup>o</sup>, and on cracking of propene, cf. Szwarc, *C.A.* 43, 8270<sup>g</sup>.

J. J. Bierman



CA

2

Theory of the kinetics of two consecutive nonreversible reactions of the second order. A. D. Bagulskiy and L. M. Timonin (Chernyshevskii Univ., Saratov). *Zhur. Fiz. Khim.* 25, 143-6 (1951).—Reactions of the biotic type  $2A \xrightarrow{h_1} 2A_1 \xrightarrow{h_2} A_2$  obey the rate laws:  $dx/dt = 2h_1(a-x)^2$  (1) and  $dy/dt = h_2(x-y)^2$  (2). From (1),  $x = at/(1+bt)$  (3), where  $b = 2h_1a$ . Putting (3) into (2):  $dy/dt = h_2y^2 - 2h_2xy + h_2x^2$  (4), a form of the Riccati equation. The integration of (4) gives:  $u = x - y = [a_1 - a_2C(1+bt)^{-1}]/(1+bt)^2 [1 - C(1+bt)^{-1}]$  (5) and  $y = [C(a_1 + a_2)(1+bt)^{-1} - at + a_1]/(1+bt)^2 [C(1+bt)^{-1} - 1]$  (6), where  $a_1 = h_2(a_0 - a_1)/b$ ,  $C = a_1/a_2$  and  $a_1, a_2$  are the roots of  $h_2a^2 - ba - ab = 0$ . Curve (5) has a max.  $u_m$  for  $t = t_0$  and curve (6) has an inflection point at the same value  $t = t_0$ . The value of  $u_m$  depends only on the ratio  $h_1/h_2 = r$  and increases with  $r$ . The inflection point of (6) shows that  $A_1$  is formed at an increasing rate at first and that an induction period occurs for  $h_1 \ll h_2$  if  $h_2$  is small. When  $h_1 \ll h_2$  with a large  $h_1$ , (6) goes into (3) and  $A_2$  is formed according to an apparently bimol. process, except in the very first stages of the reaction. Applications will be given in a subsequent paper. Michel Mandelst

Chair of Theoretical Physics

CA

**Kinetics of ethane decomposition at pressures higher than atmospheric** A. D. Stepanukovich and F. M. Mitenkov (Saratov State Univ.). *Zhur. Fiz. Khim.* 25, 203-11 (1951). The rate const.  $k$  for the thermal decompn. of ethane at 635° and at  $p$  not less than 1 atm. is calcd. as a

function of the % decompn.  $x$  (up to 12%, but still far from equil.) and the calcd. values are compared with the exptl. data of Dinties, *et al.* (C.A. 31, 7318<sup>9</sup>) who showed that  $k$  decreases for increasing values of  $x$ . Three different kinetic schemes are assumed and for each one a differential equation is set up and numerically solved, the rate const. of the individual reactions being calcd. by the transition-state method. The concn. of  $\text{Et}$  radicals is neglected throughout. The first scheme:  $\text{C}_2\text{H}_6 \rightleftharpoons 2\text{CH}_3$  (1),  $\text{R}(\text{H}, \text{CH}_3, \text{C}_2\text{H}_5) + \text{C}_2\text{H}_6 \rightleftharpoons \text{RH} + \text{C}_2\text{H}_5$  (2),  $\text{C}_2\text{H}_5 \rightleftharpoons \text{C}_2\text{H}_4 + \text{H}$  (3),  $\text{R} + \text{R} \rightarrow \text{R}_2$  (4) is rejected, because calcs. show that it leads to a monotonous increase of  $k$  with  $x$ . The 2nd scheme consists in (1), (2), (3), (4)

and  $\text{R}(\text{H}, \text{CH}_3) + \text{C}_2\text{H}_5 \rightleftharpoons \text{CH}_3\text{—C—CH}_3$  (5) and leads to

the expected decrease in  $k$  with the progress of the decompn. Reaction (5) is thus essential; its activation energy  $E_5$  is calcd. at 16 kcal. or less. Higher values of  $E_5$ , e.g. 22 kcal., as given by Rice and Polly (C.A. 22, 4037<sup>9</sup>) increase the discrepancy between calcd. and exptl.  $k$  values. The 3rd scheme is made of (1), (2), (3), (4), (5) and  $\text{R} + \text{R} \rightleftharpoons \text{R}_2$  (6). Then at  $p = 1$  atm., for  $x = 4, 6, 8, 7$ , and 12%, resp.,  $k_{\text{calcd}} \times 10^3 = 30.02, 19.02, 16.07, 17.08$ , and 7.97, whereas  $k_{\text{exptl}} \times 10^3 = 40, 46, 30, 25, 16$ . At  $p = 3.9$  atm., for  $x = 3, 4, 8$ , and 10%, resp.,  $k_{\text{calcd}} \times 10^3 = 48.69, 44.25, 14.28, 6.14$ , whereas  $k_{\text{exptl}} \times 10^3 = 30, 18, 9, 12$ . Michel Rouhart

STEPUKHOVICH, A.D.

\*\*TT.322 [Steric factors in unimolecular and bimolecular reactions] Stericheskie faktory v monomolekuliarnykh i bimolekuliarnykh reaktsiyakh. Zhurnal Fizicheskoi Khimii, 26(2): 145-155, 1952.

STEPUKHOVICH A.D.; FINKEL, A.G.

Kinetics of the decomposition of ethane in the presence of propylene at low pressures. Zhur. Fiz. Khim. 26, 1413-18 '52. (MLRA 5:12)  
(CA 47 no.13-6229 '53)

1. Saratovskiy gosudarstvennyy universitet.

Studied the kinetics of the decompn of ethane when propylene is added at two different temps. and pressures of ethane. Demonstrated that the velocity of the decompn of ethane is slowed down in accordance with A. D. Stepukhovich's eq. when propylene is added. With increasing temp, the retarding effect of propylene is reduced.

STEPUKHOVICH, A.D.

STEPUKHOVICH, A.D.; FINKEL, A.G.

Kinetics and mechanism of the decomposition of ethane in the presence of propylene. Zhur. Fiz. Khim. 26, 1419-24 '52. (MLRA 5:12)  
(CA 47 no.13:6230 '53)

1. Saratovskiy gosudarstvennyy universitet.

Considers the mechanism for the decomposition of ethane in the presence of propylene where the reactions of the active radicals combining with propylene to form inactive radicals play a principal part. An equation for the relationship between the velocity of the reaction and the concentration of the inhibitor can be derived from the assumed scheme. Gives an explanation for the decrease in the inhibiting action of propylene as the temp is increased. The relative effect of the inhibiting action of the additive depends on the initial conc. of the hydrocarbons. At the temps and quantities of the inhibitor (propylene) in question the effect is inversely proportional to the initial conc of the hydrocarbon.

STEPUKHOVICH, A.D.

The kinetics and the mechanism of the thermal decomposition of isobutene at low pressure. A. D. Stepukhovich and P. M. Bencowitz (Soviet State Univ. *Obshchei Khim.*, Akad. Nauk S.S.S.R. 1, 234-40 (1963). The thermal decomn. of isobutene at low pressures (2.39-24.8 mm.) up to 600° was detd. by the static method. The value of the const. of the decomn. rate  $k$  was calcd. for different pressures  $p$ , temps.  $T^\circ K.$ , and percentage of decomn.,  $x$ , for  $t = 2$  min. on the assumption of a unimol. reaction. Up to  $p \sim 100$  mm. the plots of  $1/k$  vs.  $1/p$  for 811 and 828°K. are straight lines expressed by the equation  $1/k = A + (B/p)$  ( $A$  and  $B$  can be calcd. by substituting the Boltzmann const., a probability factor, and  $k$  at high pressures). At first  $k$  increases up to  $x = 20\%$ , then it decreases. A plot of  $k$  vs.  $x/t$  at 864° within the range of  $p$  between 3.08 and 5.1 mm. is a straight line. These facts led to the conclusion that  $k$  decreases not because of the approaching equil. but because of the throttling effect of the products of decomn. (cf. Dintses, *C.A.* 33, 4855). The initial reaction starts at 538° and the energy of activation  $E = 64 \pm 4$  kcal./mol. The chain mechanism of the thermal decomn. of isobutene (cf. Szwarc, *C.A.* 43, 52704) fails to explain satisfactorily the available exptl. data.

I. Bencowitz

SP-1000000, N-1

USSR  
GERM:

✓ Catalytic thermopolymerization of isobutylene on quartz at low pressures. A. D. Stepanukovich and P. M. Mitenkov (Saratov State Univ.), *J. Gen. Chem. U.S.S.R.* 25, 208-7 (1953)(Engl. translation); *Zhur. Obshchey Khim.* 29, 200-3 (1953).--In the thermal decompn. of isobutylene, it was noted that in the pressure region below 2 mm., and at a temp. of 511-525°K., a catalytic thermopolymerization of isobutylene occurs on the quartz walls of the app., and predominates over decompn. It is assumed that decompn. also occurs at higher pressures, but it is completed too rapidly to be observed. A hypothetical mechanism, agreeing with the facts, is proposed. J. J. Casey

STEPUKHOVICH, A.D.

Kinetics and mechanism of the decomposition of propane in the presence of isobutylene and propylene as inhibitors. A. D. Stepukhovich and E. S. Shver (State Univ., Saratov). *Zhur. Fiz. Khim.* 47, 1013-24 (1973); cf. *C.A.* 44, 8751a. The rate of decompn. of propane (I) contg. various proportions between 0 and 30% of propylene (II) and isobutylene (III) and having a I partial pressure of 10 mm. was observed. The extent of decompn. of I is tabulated and graphed as a function of time, temp., and olefin concn. III is a more effective inhibitor than is II. The decompn. of I is a chain reaction described by the equation  $1/(w - w_0) = A + BC$ , where  $w$ ,  $w_0$ ,  $A$ ,  $B$ , and  $C$  are over-all reaction rate,  $2.32 \times 10^{-4}$  at  $590^\circ$  or  $5.75 \times 10^{-4}$  at  $620^\circ$ ,  $2.76 \times 10^{-4}$  at  $590^\circ$  or  $1.32 \times 10^{-4}$  at  $620^\circ$ ,  $1.69 \times 10^{-11}$  at  $590^\circ$  or  $0.73 \times 10^{-11}$  at  $620^\circ$ , and olefin concn., resp. The activation energies for the radical reactions  $\bar{R}(H, CH_3) + III \rightarrow RH + iso-C_4H_8$ ,  $\bar{R}(H, CH_3) + II \rightarrow RH + C_3H_6$ , and  $\bar{R}(H, CH_3) + wall \rightarrow \text{adsorbate}$  are 4.1, 6.4, and 12.3 kcal., resp. J. W. Lowenberg, Jr.



USSR/Chemistry - Cracking; Gaseous  
Hydrocarbons

Dec 53

"Kinetics and Mechanism of the Decomposition of Hydrocarbons. Comm 3. Kinetics and Mechanism of the Decomposition of Butane (I) at Low Pressures in the Presence of Isobutene (II) or Propene (III) Acting as Retardants," A. D. Stepukhovich, A. M. Chaykin, Saratov State U im N. G. Chernyshevskiy

Zhur Fiz Khim, Vol 27, No 12, pp 1737-47

At pressures of 1-30 mm and temps of 548° and 573°, decompn of I is a self-inhibiting reaction. The kinetics of the decompn of I in the presence of II

275T9

---

or III were investigated in detail and the decompn shown to be a chain reaction. The retardant effect of II was found to be greater than that of III. II and III break the reaction chain by transforming the active radical into an inactive one. The consts of individual reactions and of the wall effect in stopping reaction chains were detd. The chain lengths were calcd and the concns of  $\text{CH}_3$  radicals estd.

Stepukhovich, A. D.

# USSR.

The kinetics of the stepwise decomposition of paraffin hydrocarbons in the presence of inhibitors. A. D. Stepukhovich (N. G. Chernyshevskii State Univ., Saratov). Doklady Akad. Nauk S.S.S.R. 89, 889-92 (1953); cf. C.A. 44, 8761a; Semenov, C.A. 48, 29a.—Math. Expressions are derived for the inhibiting action of small units of admixts. (mols. having a double bond) in the decompn. of paraffin hydrocarbons from the stepwise scheme for the decompn. The effect of these admixts. depends on the initial pressure of the hydrocarbon. J. Roytar Leach.

USSR/Chemistry - Reaction Kinetics; Cracking and Combustion

21 Apr 53

"Kinetics and Decomposition Mechanism of Propane in the Presence of Added Organic Molecules,"

A. D. Stepukhovich and E. S. Shver, Saratov State U.

DAN SSSR, Vol 89, No 6, pp 1067-1070

Studied the action of addns of isobutylene and propylene on the thermal decompn of propane at 620° and 10 mm pressure of propane. Isobutylene inhibits the thermal decompn of propane twice as much as propylene. Presented by Acad N. N. Semenov, 24 Feb 53.

~~SECRET~~

STEPANKHOVICH, A. D.

U

Journal of Applied Chemistry  
June 1954  
Fuel and Fuel Products

Kinetics and mechanism of decomposition of (gaseous) paraffins in the presence of some inhibitors. A. D. Stepankhovich (*Dokl. Akad. Nauk. SSSR*, 1953, 90, 213-216). The inhibiting influence of addition of iso-butene and propene on the thermal decomposition of propane, n- and iso-butane between 550 and 620° is studied and the activation energies of the interaction of active free-radicals with mol. of additives are estimated. The activation energies can be assumed constant for any given additive. The stronger inhibiting action of iso-butene can be explained by assuming that the mechanism of inhibition involves breaking away of a H atom from the olefine mol. S. K. Lachowicz. 62

*Saratov State Univ., in N. G. Chernyshevsky.*

STEPURHEVICH A.D.

Steric factors of some elementary reversible reactions of addition of atomic hydrogen to unsaturated molecules. A. D. Stepanukhin, Doklady Akad. Nauk S.S.S.R. 92, 1121b. Steric factors for elementary uni- and bimol. addn. reactions ( $S_1$ ,  $S_2$ , resp.) of at. H to  $\text{CH}_2=\text{CH}_2$  (I),  $\text{CH}_3\text{CH}=\text{CH}_2$  (II),  $(\text{CH}_3)_2\text{C}=\text{CH}_2$  (III), and  $\text{HC}\equiv\text{CH}$  (IV) were calcd. (cf. C.I. 47, 4707). At 900°K.  $S_1$  for I and II is 1, 0.6; for III at 840°K.  $3 \times 10^{-2}$ , for IV at 816°K.  $2 \times 10^{-2}$ . Corresponding values for  $S_2$  are  $3 \times 10^{-4}$ ,  $4 \times 10^{-4}$ ,  $1 \times 10^{-3}$ , and  $1 \times 10^{-3}$ , resp. It is postulated that at these temps. the rotational sums contribute most and the vibrational magnitude remains the same ( $\sim 1$ ). Michael Dymicky

STEPUKHOVICH, A. D.

USSR/Chemistry - Hydrocarbons,  
Reaction Kinetics

11 Sep 53

"Kinetics of the Chain Decomposition of Paraffin  
Hydrocarbons," A. D. Stepukhovich

DAN SSSR, Vol 92, No 2, pp 373-376

Attempts to give a more up-to-date theory on the  
kinetics of the chain decompn of paraffin hydro-  
carbons on the basis of new exptl facts. Derived  
a differential equation for the chain decompn of  
paraffin hydrocarbons and applied it to ethane.  
Presented by Acad N. N. Semenov 21 Jul 53.

269T22

*Stepukhovich, A.D.*

USSR/Chemistry - Hydrocarbon decomposition

Card 1/1     Pub. 147 - 2/27

Authors     : Stepukhovich, A.D., and Derevenskikh, L.V.

Title        : The kinetics and mechanism of hydrocarbon decomposition. Part 2. The kinetics and mechanism of ethane decomposition at low pressures.

Periodical   : Zhur. fiz. khim. 28/2, 199-203, Feb 1954

Abstract     : The effect of isobutylene additions on the decomposition of ethane at low pressures was investigated. The quartz walls of the reactor contaminated with isobutylene decomposition products were found to have accelerated the rate of ethane decomposition. The isobutylene in itself inhibits the catalyzed and non-catalyzed ethane decomposition and saturation takes effect on the isobutylene. The kinetics of ethane decomposition was established at 635° C in the presence of isobutylene and the catalytic effect of the contaminated reactor walls was determined. The possible mechanism of inhibition reaction with isobutylene, consisting in substituting the active radicals with less active ones, which leads to the contraction of the chain, was evaluated. Nine references : 7-USSR; 1-USA and 1-English (1935-1953). Tables; graphs.

Institution   : The N. G. Chernishevskiy State University, Saratov

Submitted    : January 1, 1953

EPURHOVICH, A.D.  
USSR/ Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry.  
Catalysis

B-9

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11216

Author : III. A.D. Stepukhovich and G.I. Kats  
IV. A.D. Stepukhovich and G.P. Vorob'yeva  
V. A.D. Stepukhovich and L.V. Derevenskikh  
VI. Stepukhovich A.D., Stal'makhova L.S., Yeremin V.V.  
VII. Stepukhovich A.D., Derevenskikh L.V.

Title : Kinetics and Mechanism of Decomposition of Hydrocarbons.  
III. Kinetics and Mechanism of Thermal Decomposition of Divinyl at Low Temperatures.  
IV. Kinetics and Mechanism of Decomposition of Isobutane in the Presence of Isobutylene and Propylene as Inhibitors  
V. Kinetics of Thermal Decomposition of Gaseous Paraffins in the Presence of Added Divinyl  
VI. Kinetics of Thermal Decomposition of Gaseous Paraffins in the Presence of Acetylene  
VII. Kinetics and Mechanism of Decomposition of Gaseous Alkanes in the Presence of Allene

Orig Pub : Zhurnal fiz. khimii, 1954, 28, No 7, 1174-1185; No 8, 1361-1370; No 10, 1720-1724; No 11, 1878-1881; 1955, 29, No 12, 2129-2132

1/4



USSR/ Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry.  
Catalysis

B-9

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11216

Abstract : III. The velocity constant of divinyl decomposition, calculated in accordance with the equation of the reactions of second order, varies linearly, at 570-620° and 2-30 mm Hg pressure, depending on  $1/p_0$  ( $p_0$ -- initial pressure). Calculated were mean duration of life of divinyl molecule in activated state,  $5.10^{-8}$  seconds, the number of kinetically active degrees of freedom 20, and dissociation energy of divinyl  $E = 79.4 \pm 1.9$  kcal/mole. Decomposition of divinyl conforms to the Dintsess-Frost equation and is interpreted as a chain reaction undergoing spontaneous inhibition by decomposition products. Additions of divinyl accelerate decomposition of  $C_2H_6$  at 620°. Accelerative action of divinyl reaches a limit at 12%.

IV. By the method of inhibiting additives (RZhKhim, 1953, 8215) a study was made of thermal decomposition of isobutane at pressure of 10 mm Hg and temperatures of 548 and 573°. Addition of 0.5% slows down the decomposition sharply, on increase of the addition from 1 to 7% effectiveness of its action decreases, and with 7-10% saturation is reached (first order velocity constant acquires constant value). Under the same conditions inhibition by isobutylene is more effective than by propylene.

2/4

USSR/ Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry.  
Catalysis

B-9

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11216

Experimental data on inhibiting action of additives fit the equation:  
 $1/W - W_0 = A + BC$  (1), wherein  $W$  -- reaction velocity,  $W_0$  -- residual  
velocity,  $A$  and  $B$  -- constants,  $C(\text{add})$  -- concentration of additive,  
which proves the chain nature of the decomposition. The primary effect  
is decomposition of isobutane molecule at C-C bond. Inhibiting action  
of olefins is explained by removal of H atom by active radical from mo-  
lecule of additive with formation of inactive unsaturated radicals. By  
means of equation (1) were calculated velocity constants of the reaction  
of chain termination at the wall and at molecules of additive. Activa-  
tion energy of inhibiting reactions brought about by isobutylene and pro-  
pylene is, respectively, 5.6 and 8.5 kcal/mole, that of the reaction of  
termination at wall, 14.7 kcal/mole.

V. Study of kinetics of thermal decomposition of propane, butane and  
isobutane, in the presence of divinyl, with initial pressure of decom-  
posing hydrocarbons  $\sim 10$  mm Hg, and at temperatures of 510-593°. Ad-  
ditions of divinyl, which is a product of cracking of hydrocarbons, do  
not inhibit decomposition of these hydrocarbons. Absence of inhibiting

3/4

USSR/ Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry.  
Catalysis

B-9

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11216

action of divinyl is correlated with greater durability of C-H bond, in  $\text{CH}_2$  groups, at the double bond carbon, in comparison with durability of C-H bond in methyl groups of propylene of isobutylene.

VI. Study of kinetics of thermal decomposition of propane and butanes in the presence of 1-20%  $\text{C}_2\text{H}_2$  at pressure of decomposing hydrocarbons ~10 mm and temperatures of 500-600°. Additions of  $\text{C}_2\text{H}_2$  do not inhibit rate of decomposition. Increased values of decomposition velocity constant of propane at pressures below 10 mm, in the presence of  $\text{C}_2\text{H}_2$ , are due to the fact that that  $\text{C}_2\text{H}_2$  impedes diffusion of active centers to the walls. Thermal calculations have shown the possibility of a reaction between atomic hydrogen and  $\text{C}_2\text{H}_2$ , with formation of highly reactive vinyl radical which is stable under cracking conditions.

VII. Additions of allene inhibit cracking of  $\text{C}_3\text{H}_8$  and iso- $\text{C}_4\text{H}_{10}$ , but do not affect decomposition of  $\text{C}_4\text{H}_{10}$ . Mechanism of inhibition resides in addition of H atoms to allene molecule with formation of little active allyl radicals. Absence of inhibition in the case of  $\text{C}_4\text{H}_{10}$  is due to the fact that increase of latter occurs essentially with formation of  $\text{CH}_3$  radical. Communication II, see RZhKhim, 1957, 393.

Stepukhovich, A. D.

USSR/ Chemistry      Kinetics theory

Card                : 1/1

Authors            : Stepukhovich, A. D., and Bakhareva, I. F.

Title              : The kinetics theory of two successive one-sided reaction of different order

Periodical        : Zhur. fiz. khim. 28, Ed. 6, 970 - 975, June 1954

Abstract          : An accurate solution to the kinetic problem of two one-sided successive reactions of different order was obtained through integration of differential equations applicable to the rate of such reactions. It was established that two successive reactions of different order, at a certain constant ratio, can take place either in accordance with the bi- or mono-molecular law. Final terms for the calculation of changes, occurring during the concentration of basic substances, intermediate and final products, are presented. Four USSR references. Graph.

Institution        : The N. G. Chernishevskiy State University, Saratov

Submitted         : November 22, 1953

*Stepukhovich, A. D.*

USSR/Chemistry - Physical chemistry

Card 1/1 : Pub. 147 - 3/22

Authors : Stepukhovich, A. D.

Title : Problem concerning the A. V. Frost and A. I. Dintses kinetic equation

Periodical : Zhur. fiz. khim. 28/11, 1882-1888, November 1954

Abstract : The universality of the A. V. Frost and A. I. Dintses empirical equation in its application to kinetics of thermal decomposition of paraffins, certain diene hydrocarbons and during rubber vulcanization processes, is discussed. The equation is based on a radical-chain system of decomposition in which the wall of the vessel acts not only as a chain separation factor but also as a chain initiator. The Frost-Dintses equation was found to be best applicable to instances of heterogeneous reactions. Theoretical terms for the calculation of the inhibition coefficient and constants of the Frost-Dintses equation are presented. Fifteen references: 14-USSR and 1-USA (1928-1954).

Institution : The N. G. Chernishevskiy State University, Saratov

Submitted : September 14, 1953

USSR/Chemistry - Physical chemistry

Card 1/2 : Pub. 147 - 2/27

Authors : Stepukhovich, A. D.

Title : ~~Stepukhovich, A. D.~~  
About the equilibrium during reactions participated by radicals

Periodical : Zhur. fiz. khim. 28/12, 2088-2094, Dec 1954

Abstract : The equilibrium constants of a reversible decomposition reaction of an ethyl radical into ethylene and atomic hydrogen was calculated and the calculation results were compared by various methods. It is shown that the approximated thermodynamic method of calculating equilibrium constants of the reversible decomposition reaction leads to a highly reduced value. The chemical constants of  $C_2H_4$  and  $C_2H_5$  were computed by means of statistical methods. It is shown that the equilibrium in the  $C_2H_5 \rightleftharpoons C_2H_4 + H$  reaction is displaced toward  $C_2H_5$  and that the latter should be taken into consideration during the cracking of ethane and other hydrocarbons with the aid of stable radicals. The perspective

Zhur. fiz. khim. 28/12, 2088-2094, Dec 1954

(Additional Card)

Card 2/2

Abstract : of utilizing the Nernst heat theorem for the calculation of equilibriums in radical reactions is discussed. Fourteen references ; 12 USSR; 1 USA and 1 English (1932-1954). Tables.

Institution : State University, Saratov

Submitted : September 23, 1953

STEPURNOVICH, A. D.

The residual cracking rate of fully inhibited paraffin hydrocarbons. A. D. Stepukhovich (N. G. Chernyshevsk State Univ., Saratov, U.S.S.R. Akad. Sci. 511-12 (1954); Cl. C.A. 44, 8764a. The simplest explanation for the re-

sidual rate consists in considering it as the rate of the initial disocn. of the hydrocarbon into radicals; it may also be considered as the rate of some residual chain reaction, corresponding to some stationary state of inhibited cracking.

W. M. Sternberg

rm jhb  
MT

5-  
1-464g  
1-463d



STEPUKHOVICH, A. D.

Steric factors of the reversible combination of atomic hydrogen with propylene. A. D. Stepukhovich and Yu. S. Brusilovskaya. *Uchenye Zapiski Saratov. Univ.* 36, 41-9 (1984); *Referat. Zhur., Khim.* 1956, Abstr. No. 3424.—Calcd. by the method of transition state on the basis of geometrical models and the vibration frequencies of the mols. of propylene and propane, steric factors for the reaction  $(CH_3)_2CH \rightleftharpoons C_3H_6 + H$  agree well with the exptl. data of Melville and Robb (*C.A.* 44, 1784k). From the velocity consts. of the direct and the reverse reactions, and the equil. const. is calcd. the transmission coeff. for dissocn. of  $(CH_3)_2CH$ . The greater energy of dissocn. of  $(CH_3)_2CH$  is the cause of its stability at high temp. A. N. Eustoff

3  
1-4B3d  
1-4B4  
1-4B2c (j)  
2-may

11  
12

STEPORUKOVICH, A. D.

Rate and equilibrium constants for the reversible reaction of binding atomic hydrogen by propylene. A. D. Steporukovich and Yu. S. Brusilovskaya. *Uchenye Zapiski Saratov. Univ.* 36, 51-8 (1934); *Referat. Zhur., Khim.* 1936, Abstr. No. 12404.—On the basis of calcn. of stereochem. factors  $s$  of the reversible reaction  $\text{CH}_3\text{CHCH}_2 \rightleftharpoons \text{C}_2\text{H}_4 + \text{H}$ , the rate and equil. consts. were calcd. at various temps., both kinetic and thermodynamic methods being used. Calcd. entropies of activation for the reaction in both directions agree with values for  $s$ . J. Mloszewski

3  
1-4Bcd  
1-4Ely  
1-4Ezc (7)  
2-MAY

11  
12

STEPUKHOVICH, A.D.

17 Kinetics and the mechanism of retarded decomposition of  
paraffins with the participation of some active centers.  
A. D. Stepukhovich (N. G. Chernyshevskii State Univ.,  
Saratov). Dokl. Akad. Nauk S.S.S.R. 96, 111-14  
(1954).—On the basis of decompn. of C<sub>11</sub>H<sub>24</sub> through the  
active intermediates, a math. relation is developed that  
proves that the reported relation (C.A. 48, 12525a, 13370a)  
can be extended to the retarded decompn. of paraffins  
with active centers. Michael Dymeky

USSR/ Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 39/56

Authors : Stepukhovich, A. D., and Etingof, E. I.

Title : Steric factors of elementary reversible reactions of H-, and CH<sub>3</sub>-radicals with simple olefines

Periodical : Dok. AN SSSR 99/5, 815-818, Dec 11, 1954

Abstract : The results obtained by calculating the steric factors of reversible elementary reactions of H-, and CH<sub>3</sub>-radicals, with olefine type molecules, are presented. It was established that the steric factors involved in the reactions of the hydrogen atom separation from the olefine molecules by means of the H-radical have one and the same order of magnitude. The steric factors of reversible reactions between vinyl-, allyl- and isobutenyl-radicals and a methano molecule have an order of magnitude approximately equal to the steric factor of direct reactions. The theoretically sharp difference, in the steric factors in analogous reactions with H- and CH<sub>3</sub>-radicals, is explained. Eight references: 6-USSR; 1-USA; 1-Engl. (1954-1955). Table.

Author: A. D. Stepukhovich, Leningrad State University, Gorky  
 Date: 1954, Dokl. Akad. Nauk SSSR, June 25, 1954

USSR/Chemistry - Hydrocarbon cracking

Card 1/1 Pub. 22. - 43/63

Authors : Stepukhovich, A.D., and Tatarintsev, V.V.

Title : Cracking of paraffin hydrocarbons initiated by azomethane additions

Periodical : Dok. AN SSSR 99/6, 1049-1052, Dec 21, 1954

Abstract : It is shown that the hydrocarbon cracking reaction can be initiated by small additions of certain substances even in conditions where cracking reactions are almost impossible, e.g., at very-low temperatures. At such conditions (low temperature) the substance serving as initiators when introduced into the reactor begin decomposing forming radicals which in turn result in a chain decomposition of the hydrocarbons subjected to cracking. The initiation produced by the radicals introduced into the reaction zone, is explained on the basis of the chain theory which appears to be the best proof of the chain process. The initiating effect of azomethane depends upon the percentage-content of azomethane in the mixture. The difference in the initiating effect of azomethane in the case of propane and isobutane is explained by the difference in the steric factors. Twelve references; 6-USA and 6-USSR (1927-1953)Graphs.

Institution: The M.G. Chernishevskiy State University, Saratov

Presented by: Academician V.N. Kondratyev, June 25, 1954

STEPUKHOVICH, A.D.

USSR/ Chemistry - Physical chemistry

Card 1/1      Pub. 147 - 5/22

Authors      : Stepukhovich, A. D., and Etingof, Ye. I.

Title        : Steric factors of elementary reversible reactions of H- and CH<sub>3</sub>-radicals with simple olefines

Periodical   : Zhur. fiz. khim. 29/11, 1974-1983, Nov 1955

Abstract     : Experiments showed that the steric factors in reactions leading to displacement of H-atoms by olefine molecules and resulting in the formation of complex unsaturated radicals have a value of  $10^{-3}$ . The steric reaction factors of complex radicals having a double bond with the hydrogen molecule were found to have a value much lower than the steric factors of reversible reactions. Reactions of complex radicals with simple molecules showed much lower values of the steric factors than reactions of simple radicals with complex molecules. Fifteen references: 13 USSR and 2 USA (1948-1955). Tables.

Institution : Saratov State University im. N. G. Chernyshevskiy

Submitted   : October 23, 1954

STEPUKHOVICH, A.D.; DEREVENSKIKH, L.V.

Kinetics and mechanism of hydrocarbon decomposition. Part 7.  
Kinetics and mechanism of the decomposition of gaseous alkanes in  
presence of allene. Zhur.fiz.khim. 29 no.12:2129-2132 D '55.

(MLRA 9:5)

1. Saratovskiy gosudarstvennyy universitet imeni N.G. Chernyshev-  
skogo.

(Paraffins)

Steph. K.ovich, P. D.

6

Retardation and acceleration of cracking of paraffin hydrocarbons by addends of tetramethylethylene. A. D. ~~CHIRKOVICH~~ and E. R. ~~NIKOLIN~~ (N. G. Chernyshevskiy, Saratov). Doklady Akad. Nauk S.S.S.R. 105, 507 (1955).—Addn. of 20 mm. partial pressure of tetramethylethylene to propane followed by pyrolysis at 500° results in a great acceleration of cracking of propane; at 502° the acceleration appears after a 30 sec. induction period; at 545° the induction period extends to 20 sec. and at 573° retardation of cracking is evident. With isobutane at 573° a max. retardation occurs with 1% addend in the initial phases, after which acceleration takes place. At 548° retardation takes place, the degree of which varies with the amount of the addend, except for large concns. of the addend (over 1.5%) which cause a moderate acceleration of cracking. Tetramethylethylene alone shows decreased amount of decompn. in 548–73° range with increase of pressure from 2 mm. to 8 mm. G. M. Kosolapoff

KM



Stepukhovitch, A. D.

290

USPEKHI KHIMII

Progress in Chemistry

Vol 25, Nr 3, March, 1956, pp 257-392

Chem

STEPUKHOVICH, A. D.:

Steric Factors of Radical Reactions in Chemical Kinetics

Chemical-kinetic theory is examined and equations for calculating steric factors for various types of radical reactions are deduced. Values for several forward and reverse reactions are tabulated.

D

PM

USSR/Physical Chemistry - Kinetics. Combustion.  
Explosives. Topochemistry. Catalysis.

B-9

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 3778

Author : Stepukhovich A.D.

Title : Kinetics and Mechanism of Initiation of Cracking of  
Paraffin Hydrocarbons

Orig Pub : Zh. fiz. khimii, 1956, 30, No 3, 556-565

Abstract : A mechanism is proposed, of the initiated cracking (C) of hydrocarbons, which is based upon the concept that the initiator (I) not only accelerates but also slows down C. Reactions of isomerization of certain radicals are of significance in the propagation of chains. A kinetic equation is derived for the rate of C, and integration of the equation is effected, taking into account change in concentration of I. At low concentrations of I the rate of C increases linearly with increase in relative concentration of I. At higher

Card 1/2

- 115 -

*Stepukhovich A. D.*  
Category USSR

B 9

Abs Jour Zh. Kh., No 3, 1957, 7520

Author Stepukhovich, A. D. and Kaplan, Ye. G.

Inst Not given

Title Kinetics and Mechanism of the Decomposition of Hydrocarbons.  
I Initiation of the Cracking of Ethane by the Addition of Azo-  
methane

Orig Pub Zh. Fiz. Khimii, 1956, Vol 30, No 4, 928-933

Abstract It has been shown that azomethane (I) initiates the cracking of  
ethane at 368<sup>0</sup>; the extent of cracking, however, is less than  
that observed with other hydrocarbons. The initiating effect  
of I depends on the rate of its decomposition. Increasing the  
concentration of I decreases its effectiveness. A mechanism  
for the initiation step of the reaction is given based on the double

Card 1/2

-6-

Category USSR

B 9

Abs Jour. Zh-Kh. No 3, 1957, 7520

role of I (RZhKhim, 1957, 3778). The smaller effect of I on the cracking of  $C_2H_6$  is due to the slow rate of the reaction  $CH_3 + C_2H_6 \rightleftharpoons CH_4 + C_2H_5$  as well as to the fact that the equilibrium  $C_2H_5 \rightleftharpoons C_2H_4 + H$  is shifted to the left at low temperatures. A kinetic equation for the cracking is given.

Card

2/2

-7-

pm  
Sind

Category. USSR / Physical Chemistry - Kinetics. Combustion.  
Explosives. Topochemistry. Catalysis.

B-9

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29986

Author : Stepukhovich A. D., Bakhareva I. F.

Inst : not given

Title : Reply to the Comments of Yu. S. Sayasov

Orig Pub: Zh. fiz. khimii, 1956, 30, No 6, 1407-1409

Abs **APPROVED FOR RELEASE: 08/26/2000** **CIA-RDP86-00513R001653220020-0"**  
the paper by the authors (RZhKhim, 1955, 23283).

Category: USSR / Physical Chemistry - Kinetics. Combustion.  
Explosives. Topochemistry. Catalysis.

B-9

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29993

Author : Stepukhovich A. D., Krol' I. K.

Inst : not given

Title : Kinetics and Mechanism of Decomposition of Hydrocarbons. VIII.  
Effect of Additions of Butylenes on Kinetics of Cracking of  
Gaseous Alkanes.

Orig Pub: Zh. fiz. khimii, 1956, 30, No 8, 1718-1726

Abstract: Additions of a mixture of butenes and 1-butene, at 612 and 635° and a pressure of 20 mm Hg, inhibit cracking (C) of  $C_2H_6$ . Slowing down at 635° is observed after 1.5 minute following beginning of the reaction and increases thereafter. On lowering of the temperature of C (612°) inhibition becomes manifest during later stages of the reaction. Inhibition is caused by the product of decomposition of butenes, namely by propylene. Experimental data on C of  $C_2H_6$ , in the presence of added butenes, satisfy the equa-

Card : 1/2

-4-

Category: USSR / Physical Chemistry - Kinetics. Combustion.  
Explosives. Topochemistry. Catalysis.

B-9

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29993

tion of an inhibited C (RZhKhim, 1953, 8215). Additions of butenes do not inhibit the C of  $C_3H_6$  at 590-620° and C of butanes at 548-574°, and even accelerate the C of  $C_3H_6$ , somewhat, due to decomposition of butenes. On C of  $C_3H_6$  and butanes the auto-inhibition by decomposition products ( $C_2H_4$  and iso- $C_4H_8$ ) overlaps the slowing down effect of additions. Decomposition of 1-butene was also studied. Part VII, see RZhKhim, 1957, 11216.

Card : 2/2

-5-

Kinetics and mechanism of the cracking of hydrocarbons.

XII The effect of cyclohexane on the kinetics and mechanism of the cracking of gaseous alkanes. A. M. Skolnikov and I. G. Koshova. *Chem. Abstr.* 80, 147582 (1975). The effect of the addition of cyclohexane to the thermal cracking of butane and propane was studied statically at 0.1-0.2 mm. and 540-600°. The initial pressure of I was found to be const. during the 10-min. period of cracking and I did not slow down the cracking of  $C_4H_{10}$  or  $C_3H_8$ . The steric factors of the reactions  $H_2 + C_4H_9 \rightarrow H_2 + C_4H_9$  and  $CH_4 + C_4H_9 \rightarrow CH_4 + C_4H_9$  were calc. by the method of S. (C.A. 50, 3856d) and were found to be almost 3 times greater for the 2nd reaction than for the first one. This was also the case in the reaction involving olefins (S. and Etingof C.A. 49, 15392f). An evaluation of the heat effects and of the activation energies of the two reactions with cyclohexane show that these reactions may occur. The behavior of the  $C_4H_9$  radical under cracking conditions may be explained by its greater similarity to paraffins, with respect to adsorption on the walls of the vessel, than to olefins.

W. M. Sternberg

*RM gmb mt*



STEPUKHOVICH, A.D.

Equilibrium in addition and substitution reactions of H and  $\text{CH}_3$  radicals with unsaturated and saturated hydrocarbons. Zhur. fiz. khim. 30 no.11:2387-2398 N '56. (MLRA 10:4)

1. Saratovskiy gosudarstvennyy universitet im. N.G. Chernyshevskogo.

(Hydrocarbons) (Chemical reaction--Mechanism)  
(Substitution (Chemistry))

*Stepukhovich, A.D.*

✓ Effect of temperature on steric factors in simple and radical reactions. A. D. Stepukhovich (N.G. Chernyshevskii State Univ., Saratov). Doklady Akad. Nauk S.S.S.R. 107, 436-6(1955).—The validity of the usual comparison of reactivities based exclusively on activation energies and ignoring steric factors is critically examined. For reactions with high activation energies such comparison is fairly valid, since the alterations in steric factors are not usually large enough to predominate. For reactions with low activation energies, including especially free radical reactions, the steric factors can be of foremost importance, and can even be responsible for the observed temp. dependences of the reaction rate consts. The temp. coeff. of steric factors in 1st- and 2nd-order reactions are derived from the basic equations interrelating the collision and transition-state theories. It is principally the vibrational partition functions of the reactants and the activated complex that det. the temp. coeffs. Only those vibrations in bonds undergoing change need be considered; this makes evaluation of temp. coeffs. of steric factors reasonably simple and straightforward even in reactions involving fairly complicated mol.

John R. Kosik

*KB  
mgi*

STEPUKHO, A. D.

✓ The kinetics of the multicentered chain retardation of propane and isobutane decomposition. A. D. Stepukhovich and B. I. Khafkin (N. G. Chernyshevskii State Univ., Saratov). *Zhur. Fiz. Khim.* 31, 123-32 (1957). — The kinetic equation for the retarded chain breaking, with participation of 3 active centers (C.I. 40, 5958; 50, 5257b),  $1/(w - w_0) = A' + B'c_{add}$ . ( $w$  is the rate of decomposition, the residual decomposition rate at complete inhibition,  $c_{add}$ , the concn. of the retarding addn.,  $B'$  a const. connected with the const. of the inhibited reaction, and  $A'$  is connected with the interaction of the active centers with the vessel walls), is also applicable to more complex hydrocarbons, such as butane and propane. The velocity consts. of the substitution reactions of different radicals with the same

radl. or unradl. mol. are in a const. proportion, which can be used to find the unknown consts. — W. M. S. G. (1957)

*Stepukhovich, A.D.*

USSR/Chemical Technology - Chemical Products and Their Application. Treatment of Natural Gases and Petroleum. Motor and Jet Fuels. Lubricants. I-8

Aos Jour : Ref Zhur - Khimiya, No 1, 1958, 2548

Author : Stepukhovich, A.D.

Inst : -

Title : Concerning the Nature of Residual Velocity of Fully Decelerated Cracking of Paraffin Hydrocarbons.

Orig Pub : Zh. fiz. khimii, 1957, 31, No 2, 511-512

Abstract : Residual velocity of cracking of paraffin hydrocarbons decelerated by additives, is considered as the velocity of a certain residual chain reaction, corresponding to a certain steady state of decelerated cracking. It is noted that the reaction of disproportionation between allyl radicals and molecules of olefins can be of significance also in the case of cracking of paraffins. In this case the residual velocity is also the velocity of a steady state

Card 1/2